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(54) **NOBLE METAL-BASED  
ELECTROCATALYST AND METHOD OF  
TREATING A NOBLE METAL-BASED  
ELECTROCATALYST**

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CPC ..... **H01M 4/926** (2013.01); **H01M 4/921**  
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(58) **Field of Classification Search**  
CPC ..... H01M 8/02  
See application file for complete search history.

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(57) **ABSTRACT**

A noble metal-based electrocatalyst comprises a bimetallic  
particle comprising a noble metal and a non-noble metal and  
having a polyhedral shape. The bimetallic particle comprises  
a surface-segregated composition where an atomic ratio of  
the noble metal to the non-noble metal is higher in a surface  
region and in a core region than in a sub-surface region  
between the surface and core regions. A method of treating  
a noble metal-based electrocatalyst comprises annealing a  
bimetallic particle comprising a noble metal and a non-noble  
metal and having a polyhedral shape at a temperature in the  
range of from about 100° C. to about 1100° C.

**12 Claims, 6 Drawing Sheets**

